

CLAIMS

What is claimed is:

1. A method for assessing the performance of a hearing aid that includes an implantable actuator, comprising:

5 positioning a test device external to a patient having the implanted actuator;

utilizing the test device to obtain at least one test measure of an electrical signal passing through the actuator; and

10 employing the at least one test measure to assess at least one performance parameter for the hearing aid.

2. The method of Claim 1 wherein the employing step includes:

15 comparing the at least one test measure to a first predetermined range to assess a first performance parameter.

3. The method of Claim 2 comprising:

providing an output indicative of the first performance parameter.

4. The method of Claim 2 wherein the employing step includes:

20 comparing the at least one test measure to a second predetermined range to assess a second performance parameter, wherein the second predetermined range is at least partially non-overlapping with the first predetermined range.

5. The method of Claim 4 comprising:

providing an output indicative of the second performance parameter.

5 6. The method of Claim 4 comprising:

providing at least one predetermined test signal for use in generating the electrical signal passing through the actuator.

7. The method of Claim 4 comprising:

10 providing a plurality of predetermined test signals for use in generating a corresponding plurality of electrical signals passing through the actuator, wherein the plurality of predetermined test signals include a corresponding plurality of different frequencies distributed across a predetermined frequency range.

15 8. The method of Claim 7 wherein the utilizing step includes:

utilizing the test device to obtain a plurality of test measures corresponding to the plurality of electrical signals passing through the actuator.

9. The method of Claim 8 wherein the employing step includes:

20 identifying a resonant frequency of the actuator using the plurality of test measures.

10. The method of Claim 6 wherein the at least one predetermined test signal has a frequency within a predetermined range of a resonant frequency of the actuator.

5 11. The method of Claim 6 wherein the utilizing step includes:
inductively coupling the at least one test signal between an external transmitter and a subcutaneous coil, wherein the subcutaneous coil provides the electrical signal to the actuator.

10 12. The method of Claim 6 wherein the utilizing step includes:
providing the at least one test signal to an implanted microphone, wherein the implanted microphone provides the electrical signal to the actuator.

15 13. The method of Claim 2 wherein comparing the at least one test measure to the first predetermined range to assess the first performance parameter includes:

using the at least one test measure to determine if the hearing aid is operational.

14. The method of Claim 9 wherein the step of comparing the at least one test measure to the second predetermined range to assess the second performance parameter includes:

5 using a test measure obtained in corresponding relation to the resonant frequency to assess an interface between the actuator and a component of the auditory system of the patient.

15. The method of Claim 14 comprising:

10 responsive to determining the interface between the actuator and the component of the auditory system is undesirable, repositioning the actuator to achieve a desirable interface.

16. The method of Claim 15 wherein the repositioning step includes:

15 providing an electrical input to a positioning system to selectively position the actuator relative to the component of the auditory system.

17. The method of Claim 16 wherein the step of providing the electrical input comprises:

20 providing a wireless signal to the positioning system from a position external to the patient.

18. The method of Claim 16 wherein the step of providing the electrical input comprises:

inductively coupling the electrical input to the positioning system.

5 19. The method of Claim 1 wherein the at least one test measure comprises:

a measure of a magnetic field generated by the actuator in response to the electrical signal passing through the actuator.

10 20. The method of Claim 1 wherein the at least one test measure comprises:

a measure of an impedance of the actuator in response to the electrical signal passing through the actuator.

15 21. The method of Claim 20 wherein the step of obtaining at least one test measure includes:

measuring a voltage of the electrical signal passing through the actuator;

measuring a current of the electrical signal passing through the actuator;

providing the measured voltage and current to the test device; and

20 in the test device, computing the impedance from the voltage and current measurements.

22. A system for assessing the performance of and adjusting a hearing aid that includes an implantable actuator, comprising:

5 a test device to obtain at least one test measure of an electrical signal passing through the actuator and employ the at least one test measure to assess at least one performance parameter of the hearing aid; and

a positioning system connected to the actuator to selectively position the actuator relative to a component of the auditory system based on the assessed at least one performance parameter

10 23. The system of Claim 22 wherein the test device is configured to compare the at least one test measure to a first predetermined range to assess a first performance parameter of the hearing aid.

15 24. The system of Claim 23 wherein the test device is configured to provide an output indicative of the first performance parameter.

25. The system of Claim 23 wherein the first performance parameter is a determination of whether the hearing aid is operational.

20 26. The system of Claim 23 wherein the test device is configured to compare the at least one test measure to a second predetermined range to assess a second performance parameter of the hearing aid, wherein the second

predetermined range is at least partially non-overlapping with the first predetermined range.

27. The system of Claim 26 wherein the test device is configured to provide an output indicative of the second performance parameter.

28. The system of Claim 23 wherein the second performance parameter is a status of an interface between the actuator and the component of the auditory system.

29. The system of Claim 28 wherein the positioning system comprises:
a fixed member connected to a mounting device for mounting the positioning system to a patient's skull;

a telescoping member movable relative to the fixed member and having the actuator disposed on a distal end thereof;

a user device externally located relative to the patient to generate and provide electrical inputs; and

a driver to process the electrical inputs to selectively position the telescoping member relative to the fixed member.

30. The system of Claim 22 wherein the test device is configured to provide at least one predetermined test signal for use in generating the electrical signal passing through the actuator.

31. The system of Claim 22 wherein the test device is configured to provide a plurality of predetermined test signals for use in generating a corresponding plurality of electrical signals passing through the actuator, wherein the plurality of predetermined test signals include a corresponding plurality of
5 different frequencies distributed across a predetermined frequency range.

32. The system of Claim 22 wherein the at least one test measure is a measurement of an impedance of the actuator.

33. The system of Claim 22 wherein the at least one test measure is a measurement of a magnetic field generated in response to the electrical signal passing through the actuator.

34. The system of Claim 30 wherein the at least one test signal has a
15 frequency within a predetermined range of a resonant frequency of the actuator.

35. The system of Claim 30 wherein the at least one test signal is inductively coupled to a subcutaneous coil wherein the coil provides the electrical signal to the actuator.

36. The system of Claim 30 wherein the at least on test signal is provided to an implanted microphone, wherein the implanted microphone provides the electrical signal to the actuator.